Synchronizing the Digital Transition:
What Must Happen Between When the DTV Table of Allotments is Final and When the Analog Signals are Shutoff?
January 30, 2005

The Federal Communications Commission ("the Commission") plans to handle the above-referenced synchronization in the *DTV Third Periodic Review*. At this point, it is our understanding that no date has been set for the release of that *Notice of Proposed Rulemaking.* Making the final move from analog to digital with a minimal loss of service to consumers will require both precise "what happens in what order" rules from the Commission and forward planning by individual stations once we know where our final DTV channel will be located. Since we do not know how the Commission will structure the "what happens in what order" rules, this paper only addresses what must happen from the individual station perspective. An individual station's situation will vary based upon the following factors:

1. Final DTV Channel Assignment
    a. Is the station remaining on its current DTV in-core channel?
    b. Is the station returning to its analog in-core channel?
    c. Is the station moving to a completely new channel through a negotiated channel agreement or a "best available" assignment by the Commission?
        i. If yes, does another in-market[1] station currently occupy that channel with a DTV or an analog signal?
        ii. If yes, does an out-of-market station currently occupy the new channel in an adjacent market?[2]
2. Space Between Current DTV Channel and Final DTV Channel

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[1] Market in this document means Nielsen's Designated Market Area ("DMA").
[2] There could be multiple out-of market stations in multiple adjacent markets occupying the station's new assigned DTV channel.

a. If the channels are 5-6 channels apart, then fewer technical changes are required (for example, current DTV is Channel 53 and final DTV is Channel 48).
b. If the channels are more than 5-6 channels apart, much more is required (for example, current DTV is Channel 53 and final DTV is Channel 5).

3. Towers
    a. Based on interference and final DTV channel assignments, there may be a *few* stations that must change DTV tower locations. If this occurs, numerous questions arise, including is there an existing tower that the station can lease space on or does a new tower have to be constructed? Because of purchasing or leasing land with appropriate FAA clearances, local and state zoning requirements, and varying timelines for designing the new tower, ordering equipment, delivery of equipment, getting on a construction crew's schedule, and the construction period (generally spring through fall),[3] it is very difficult to project how long before a new tower is ready for use. For example, WRAL-DT's 2000 feet DTV tower was under construction 12-15 months.
    b. Even though a station may not require a tower change, it may require an antenna change on the tower.
        i. If a station is the lone occupant on a tower, then no coordination is required.
        ii. However, in many markets multiple stations share DTV towers. For example, in Raleigh-Durham, six stations occupy WRAL-DT's DTV tower.[4] Unfortunately, only one

[3] Due to weather in many parts of the country, tower construction during the winter months is almost impossible.
[4] Raleigh-Durham stations sharing one tower include: WRAL-DT (CBS); WRAZ-DT (FOX); WNCN-DT (NBC); WNCN-TV (NBC); WLFL-DT (WB); and WRDC-DT (UPN).

antenna can be moved at a time, so this will require coordination and will affect a station's timeline.

Applying the above factors, below are some examples of what must occur between a station's final DTV assignment and shutting off the analog signals. Below I have outlined a number of scenarios. We believe most stations will fall into one of the variations of these categories. I address the categories and the technical changes that may have to occur based on the station's category. Remember that the Commission must set the synchronization rules.

Category A:
DTV Final In-Core Channel is the Same as Current In-Core DTV Channel

Variation #1:
Current DTV Channel is Licensed

If the current DTV channel is licensed, then the station is operating at its Commission authorized height and power. From the technical end, these stations simply turn off the analog except in one case. *Exception:* During the channel election and repacking process, the Commission is giving this category of stations the highest interference protection to operate as licensed, "except against interference that may result from the establishment of DTV stations at full replication facilities to accommodate all stations currently allotted an out-of-core channel with a channel in the DTV core spectrum." What does this mean? The Commission may require the current licensed DTV channels to adjust their transmitter power, their antenna design, their antenna location, or some combination thereof to accommodate out-of-core stations. Actions and time required for each adjustment are estimated as follows:

- Adjusting transmitter power: If reducing power, it is a simple adjustment most likely done by in-house engineers.

- Redesigning antenna: This is a likely scenario, as antennas may have to be redesigned directional to protect a signal on one side or another of the station's coverage area. Due to vendor delivery times, it could take up to six months to design, order and receive a new antenna.
- Relocating antenna or installing redesigned section(s) of antenna: Presuming the same tower site and good weather, it will take a crew approximately two-three weeks to complete the installation once the redesigned section(s) of the antenna and crew are on site. One delay may be scheduling a construction crew, as there are only a limited number of crews and the demand is likely to be high due to stations nationwide making moves within the same time period. If an entirely new antenna is required, the time period may be greater.

Variation #2:
Current DTV Channel is Operating under Special Temporary Authority ("STA")

By the time the DTV Table of Allotments is final, stations will only be operating under STAs in special circumstances, due to the Commission's upcoming July 2005 and 2006 replication/maximization deadlines. Some STAs may involve international interference if border issues have not been resolved. Again, stations may be required to adjust their transmitter power, their antenna location, their antenna design, or some combination thereof to accommodate international interference or interference resulting from the repacking exception mentioned previously. *See work and time estimates in Category A, Variation #1.*

Additionally, some stations in this variation may be operating under an STA because their analog and digital antennas are located on the same tower, and the analog antenna must move before the digital antenna can be placed in its

final location to allow the station to be licensed at its authorized height. To relocate the antenna and the waveguide[5] in this situation, it will take a crew approximately three weeks.

Category B:
DTV Final Channel is the Same as Current In-Core Analog Channel

Variation #1:
DTV Final Channel and Current In-Core Analog Channel are No More than 5-6 Channels Apart

This may require only minor modifications to the station's DTV transmitter. If only minor parts are required, the parts may be available on a vendor's shelf. If major components are required, it may take up to two months to receive. The modifications will take four to five days once the parts are at the transmitter site.

Variation #2:
DTV Final Channel and Current In-Core Analog Channel are More than 5-6 Channels Apart

This is the worst scenario, because it requires a new antenna, a new waveguide and a new transmitter. Plus, the station will lose its previous $1.5-2 million investment. Based on demand, it could take up to eight months to receive the new antenna and transmitter if ordered today. It will take approximately two weeks to take the old antenna down and approximately two months to put the new antenna and waveguide up.[6] Again, crew availability and weather are factors affecting the timeline. In this scenario, a digital station could be off the air approximately four months.

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[5] A waveguide is the line running from the transmitter at the bottom of the tower to the antenna.

[6] An antenna may weigh up to 20 tons and requires a huge specialty installation crew. For example, when WRAL-DT's 2000 feet tower was built, there were only four crews in the country capable of doing this level of installation. Crews run the waveguide up the tower in sections with its installation requiring 3-4 weeks.

The analog's over-the-air signal could be affected as well if it is on the same tower.

Category C:
DTV Final Channel is Completely New Channel

Same as Variations #1 and #2 in Category B, except a station is coordinating with a third party or parties station(s) on timing based upon the Commission's synchronization rules.

As the above indicates, there are many possible variations and the Commission must tell us who goes first and how the whole synchronization process will work. If a new tower is involved, then the timeline extends substantially. This is our first pass at thinking through the above, so I am sure I have omitted something. Please let me know if you have questions. I reserve the right to send you updates as we go along!

Thanks very much.

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